

WHAT IS CLAIMED IS:

- 5            1.    A process for making nanoscale flakes comprising:  
             providing a vacuum deposition chamber containing a deposition  
             surface;  
             providing a release coat source and a flake deposition source  
             in the vacuum deposition chamber, each directed toward the  
10        deposition surface;  
             depositing on the deposition surface under vacuum in  
             alternating layers a vaporized polymeric release coat layer from the  
             release coat source and vapor deposited discrete islands of flake  
             material from the flake deposition source to build up in sequence a  
15        multi-layer vapor deposit of flake material layers comprising  
             discrete islands of the flake material separated by and deposited on  
             corresponding intervening release coat layers;  
             the release coat layers comprising a polymeric material which  
             was vaporized under vacuum to form a smooth continuous solvent  
20        soluble and dissolvable barrier layer and support surface on which  
             each of the layers of flake material is formed; and  
             removing the multi-layer vapor deposit from the vacuum  
             deposition chamber and separating it into nanoscale flake particles  
             by treatment with a solvent which dissolves the release coat layers  
25        and yields flakes with smooth, flat surfaces which are essentially  
             free of the release coat material.

2.    The process according to claim 1 in which the flake layer  
             comprises a vapor-deposited material selected from the group  
30        consisting of metal in elemental form, an inorganic material, and a  
             non-metal.

3.    The process according to claim 2 in which the non-metal  
             comprises silicon monoxide, silicon dioxide or a polymeric material,  
35        in which the inorganic material is selected from the group  
             consisting of magnesium fluoride, silicon monoxide, silicon dioxide,

aluminum oxide, aluminum fluoride, indium tin oxide, titanium  
dioxide and zinc sulfide, and in which the metal is selected from  
5       the group consisting of aluminum, copper, silver, chromium, indium,  
nichrome, tin and zinc.

4.     The process according to claim 1 in which the release  
coat material is selected from styrene or acrylic polymers or blends  
10       thereof.

5.     The process according to claim 1 in which the flake  
layers are deposited to a flake (discrete island) thickness of less  
than about 100 nanometers.

6.     The process according to claim 1 in which the release  
coat layer comprises a thermoplastic polymeric material.

7.     The process according to claim 1 in which the release  
coat layer comprises a lightly cross-linked resinous material which  
20       is dissolvable in an organic solvent to yield the flakes which are  
essentially free of the release material.

8.     The process according to claim 1 in which the release  
25       coat layers are dissolvable in an organic solvent.

9.     A process for making flakes comprising:  
providing a vacuum deposition chamber containing a deposition  
surface;

30       providing a release coat source and a flake deposition source  
in the vacuum deposition chamber, each directed toward the  
deposition surface;

depositing on the deposition surface under vacuum in  
alternating layers a vaporized polymeric release coat layer from the  
35       release coat source and a vapor deposited layer of flake material

from the flake deposition source to build up in sequence a multi-layer vapor deposit of flake material layers separated by and deposited on corresponding intervening release coat layers;

the release coat layers comprising a polymeric material which was vaporized under vacuum to form a smooth continuous solvent soluble and dissolvable barrier layer and support surface on which each of the layers of flake material is formed;

in which the release coat source comprises a wire feed mechanism in which the polymeric release coat material is coated onto a wire fed to the vacuum chamber and evaporated under heat therein to be deposited as said release coat layer; and

removing the multi-layer vapor deposit from the vacuum chamber deposition and separating it into flakes by treatment with a solvent which dissolves the release coat layers and yields flakes with smooth, flat surfaces which are essentially free of the release coat material.

10. The process according to claim 9 in which the release coat material is selected from styrene or acrylic polymers or blends thereof.

11. The process according to claim 9 in which the wire feed mechanism delivers the coated release coat material to a heater block positioned adjacent the deposition surface for evaporating the release coat material.